DoD Systems Engineering Major Program Support Overview

Mr. Rick Muldoon

Office of the Deputy Assistant Secretary of Defense for Systems Engineering

Major Program Support

(Contractor Support)

On Site Representative for

NAVAIR MDAP Programs

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JAN 2012		**00-00-2012 to 00-00-2012**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
DoD Systems Engineering Major Program Support Overview	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Office of the Deputy Assistant Secretary of Defense for Systems Engineering,Major Program Support,3030 Defense Pentagon, Room 3C167,Washington,DC,20301-3030	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Presented at the APMSE Quarterly Training ? 1st Qtr CY2012, Jan 2012, Paxtuxent River, MD

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**14**	

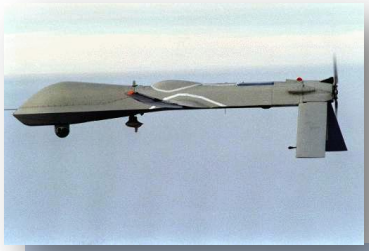
DASD, Systems Engineering Mission

Develop and grow the Systems Engineering capability of the Department of Defense – through engineering policy, continuous engagement with component Systems Engineering organizations and through substantive technical engagement throughout the acquisition life cycle with major and selected acquisition programs.

A Robust Systems Engineering Capability Across the Department Requires Attention to Policy, People and Practice

We apply best engineering practices to:

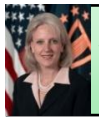
- Support and advocate for DoD Component initiatives
- Help program managers identify and mitigate risks
- Shape technical planning and management
- Provide technical insight to OSD stakeholders
- Identify systemic issues for resolution above the program level



DASD, Systems Engineering

DASD, Systems Engineering
Stephen Welby

Principal Deputy
Kristen Baldwin



Systems Analysis
Kristen Baldwin (Acting)

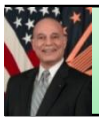
Addressing Emerging Challenges on the Frontiers of Systems Engineering

- Analysis of Complex Systems/Systems of Systems
- Development Planning/Early SE
- Program Protection/Acquisition Cyber Security
- University and Industry Engineering Research
- Modeling and Simulation

Major Program Support
James Thompson

Supporting USD(AT&L) Decisions with Independent Engineering Expertise

- Engineering Assessment / Mentoring of Major Defense Programs
- Program Support Reviews
- OIPT / DAB / ITAB Support
- Systems Engineering Plans
- Systemic Root Cause Analysis



Mission Assurance
Nicholas Torelli

Leading Systems Engineering Practice in DoD and Industry

- Systems Engineering Policy & Guidance
- Specialty Engineering (System Safety, Reliability and Maintainability Engineering, Quality, Manufacturing, Producibility, Human Systems Integration (HSI))
- Technical Workforce Development
- Standardization

Providing technical support and systems engineering leadership and oversight to USD(AT&L) in support of planned and ongoing acquisition programs

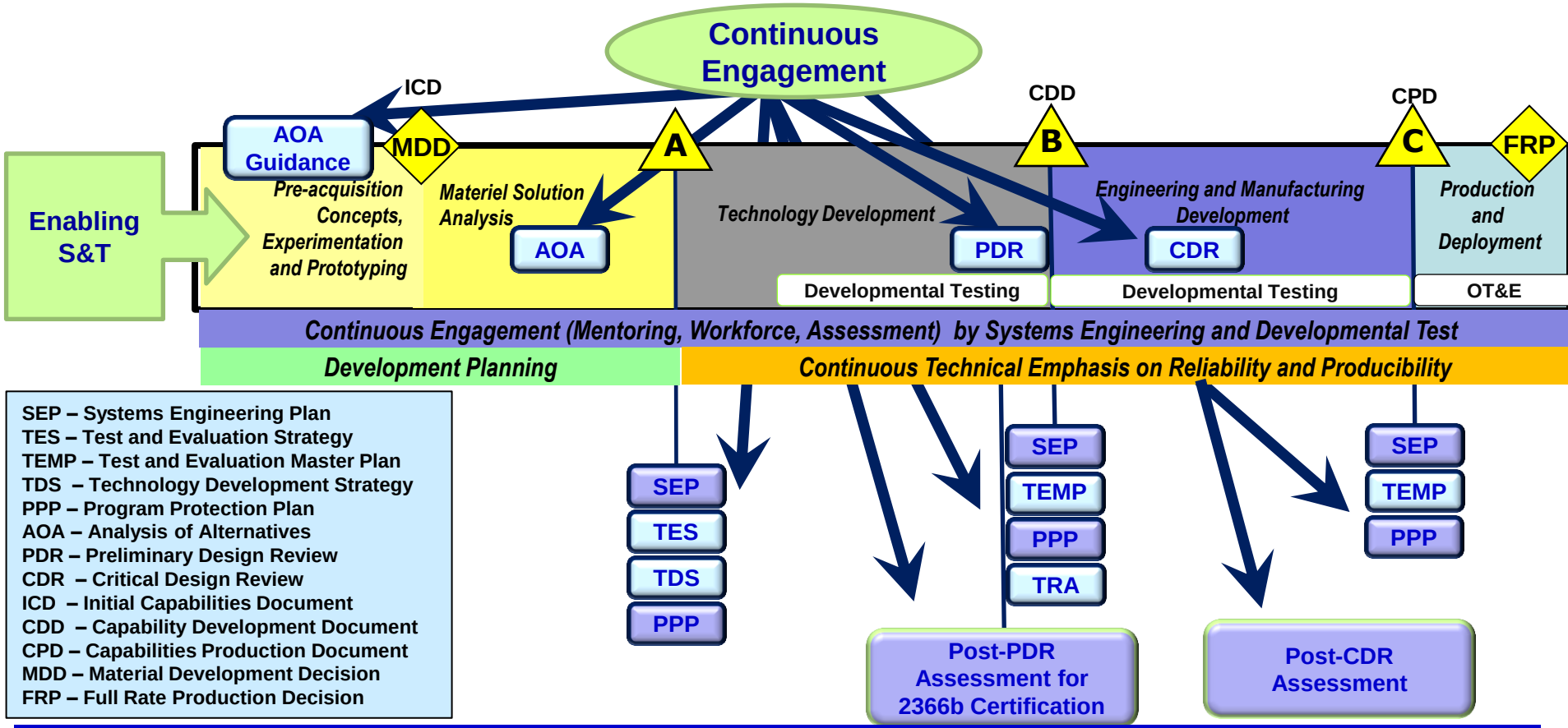
Systems Engineering Support to Acquisition Programs

Implementing Statutory Authorities Provided under WSARA:

- **Continuous Technical Engagement, Oversight and Review of Service Acquisition Programs' SE and Development Planning Capabilities**
  - Continuous, Constructive Engagement with Service Product Centers
  - Directed and Event-driven Technical Reviews
  - Sharing Best Practices across the Department
- **Advising USD(AT&L) on SE and Development Planning**
  - Active Participant in MDAP and MAIS Major Milestone Decision making
  - Program Support Reviews
  - PDR and CDR assessments
- **Reviewing /Approving MDAP and MAIS Systems Engineering Plans (SEPs)**
- **Developing SE and Development Planning Policy and Guidance**
  - Development Planning Directive-Type Memorandum (DTM) released September 13, 2010
  - Reliability, Availability and Maintainability DTM released March 21, 2011
  - AT&L Expected Business Practice Memos regarding Technology Development Strategy/Acquisition Strategy, Systems Engineering Plan, and Program Protection Plan policy and guidance released
  - Instruction Codifying DASD, Systems Engineering Functions released August 2011
  - New and Revised Systems Engineering Guidance and Handbooks

Acquisition Process Engagement

SE has a role in all major acquisition program milestone decisions and oversees and executes critical acquisition risk management processes to reduce program cost, acquisition time and risk.



SEP – Systems Engineering Plan
TES – Test and Evaluation Strategy
TEMP – Test and Evaluation Master Plan
TDS – Technology Development Strategy
PPP – Program Protection Plan
AOA – Analysis of Alternatives
PDR – Preliminary Design Review
CDR – Critical Design Review
ICD – Initial Capabilities Document
CDD – Capability Development Document
CPD – Capabilities Production Document
MDD – Material Development Decision
FRP – Full Rate Production Decision

Cross-Cutting Efforts: Acquisition Workforce Management, Engineering Policy and Guidance, Advocacy for Service Competencies and Initiatives, STEM Initiatives

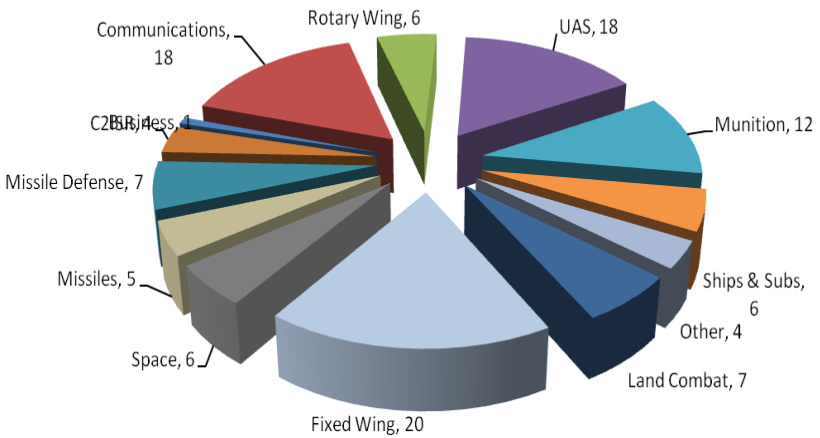
Program Support Applications

- **Program Support Review (PSR)**
  - Detailed, cross-cutting assessment to support major program decisions (Pre-A, Pre-B, Pre-C, FRP)
  - Other times as directed/required
- **Tailored Assistance**
  - Deep dive on particular issue or PM request, e.g. software, manufacturing, RFP review, IMP/IMS
  - PDR, CDR, SE WIPT, T&E WIPT
- **Special Purpose**
  - Nunn-McCurdy
  - Non-Advocate Review (PM funded)
- **Systemic Root Cause Analysis (SRCA)**
  - Identify systemic issues at the root cause level
  - Mitigate problems at the source
  - Inform best practices/inform policy

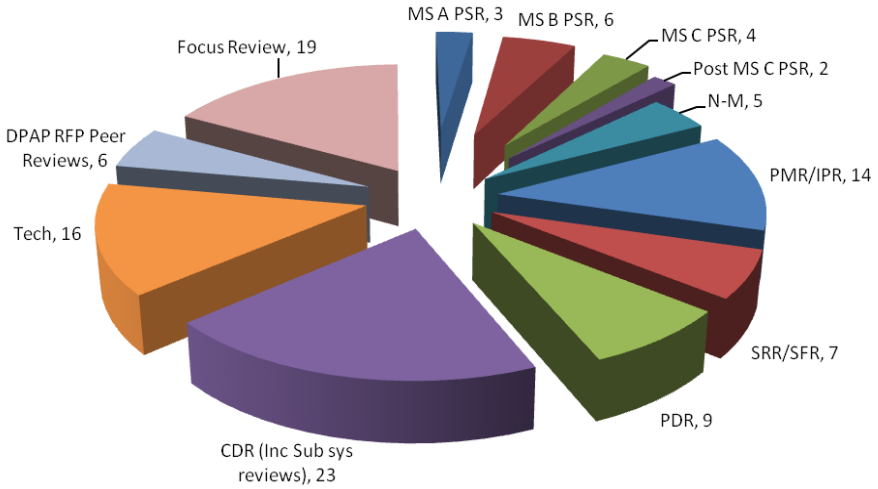
Transparent, Continuous Engagement with Programs to Ensure Program Success

FY11 DASD(SE) Program Engagements

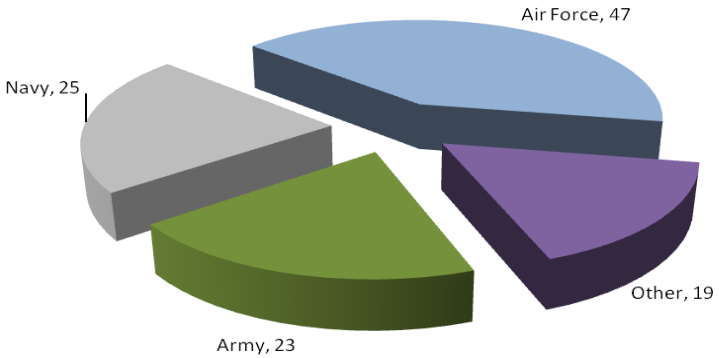
Domain



SE Touch Point



Service



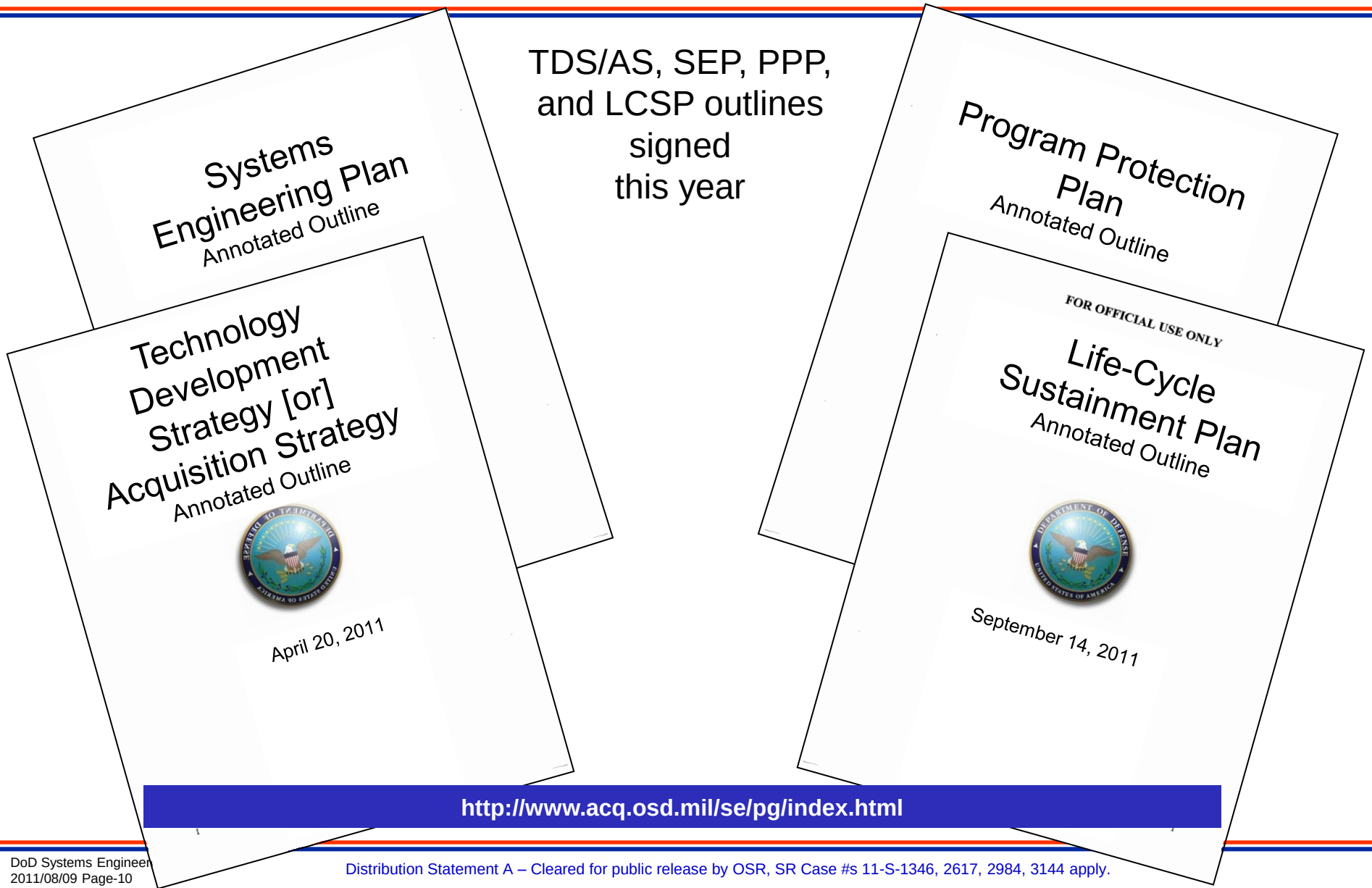
2011 Systemic Findings

Aug 2011

Rank	Negative Systemic Finding	% Reviews
	Staffing – 64%, 5 (%of reviews, # of Systemic Findings)	
1	Marginal program office and contractor staffing levels	39
	Budget – 36%, 2	
2	Program suffers from lack of funding stability	29
	Management Structure/Communications – 59%, 10	
3	Progress is impeded by lack of good communications between Government and contractors	25
	Program Plan/Schedule – 65%, 6	
4	Program is unlikely to achieve schedule	26
11	Program has an inadequate system engineering process	20
	Design Verification – 61%, 5	
5	TEMP/TES is immature or late	25
9	Testing is incomplete or inadequate	23
10	Testing schedule is aggressive/success-oriented / and highly concurrent	22
	Capabilities/Requirements – 44%, 4	
6	Requirements are not stable and continue to churn	24
	Acquisition Strategy – 43%, 4	
7	Acquisition Strategy needs to be restructured or updated	24
	Management Methods & Metrics – 69%, 10	
8	Risk management tools and methodology are not sufficient	23

Annotated Outlines Released as "Expected Business Practice"

TDS/AS, SEP, PPP, and LCSP outlines signed this year

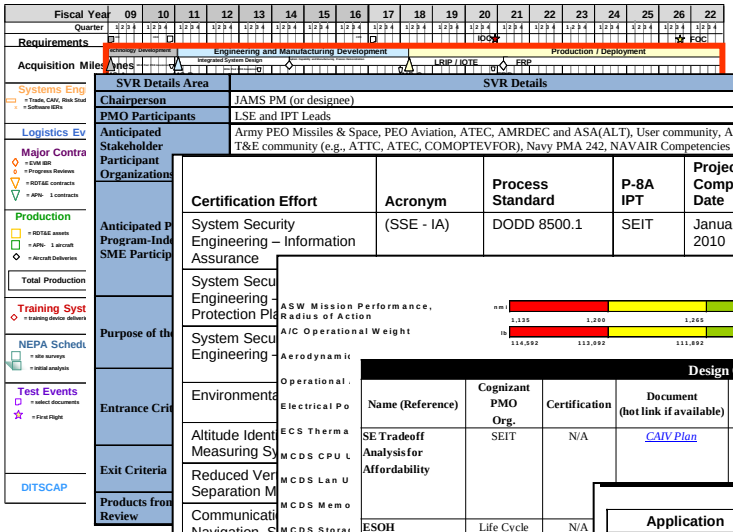


http://www.acq.osd.mil/se/pg/index.html

New SEP Outline Content and Purpose

Key Sections	Rationale
1. Introduction	• **Tracks revision control**
2. Program Technical Requirements 2.1. Architectures and Interface Control 2.2. Technical Certifications	• **Summarizes the expected architecture products, external interfaces, and links to common architectures** • **Identifies required system-level certifications**
3. Engineering Resources and Management 3.1. Technical Schedule and Schedule Risk Assessment 3.2. Engineering Resources and Cost/Schedule Reporting 3.3. Engineering and Integration and Risk Management 3.4. Technical Organization 3.5. Relationships with External Technical Organizations 3.6. Technical Performance Measures and Metrics	• **Documents integrated, event-driven system development schedule including WBS and IMP/IMS** • **Describes risk management process and organization; identifies system-level technical risks and opportunities** • **Diagrams technical structure and staffing (e.g., IPTs, Working Groups, etc.)** • **Identifies management of outside organizational interfaces** • **Describes program's use of metrics to measure technical progress**
4. Technical Activities and Products 4.1. Results of Previous Phase SE Activities 4.2. Planned SE Activities for Next Phase 4.3. Requirements Development and Change Process 4.4. Technical Reviews 4.5. Configuration and Change Management Process 4.6. Design Considerations 4.7. Engineering Tools	• **Summarizes completed system-level technical reviews, independent reviews, and trade studies and analogous plans for the next phase** • **Describes processes for requirements analysis, decomposition, and change management** • **Summarizes technical review planning details and responsibilities** • **Lists technical baseline artifacts and describes their management** • **Identifies relevant design considerations and linkage to contracts** • **Lists tools and required tool interfaces, if necessary**

SEP: Systems Engineering Tables



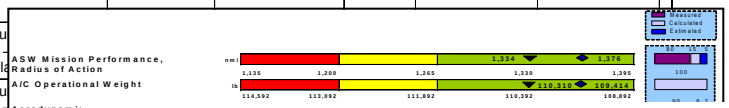
Technical Schedule

SVR Details Area	SVR Details
Chairperson	JAMS PM (or designee)
PMO Participants	LSE and IPT Leads
Anticipated Stakeholder Participant Organizations	Army PEO Missiles & Space, PEO Aviation, ATEC, AMRDEC and ASA(ALT), User community, AMCOM, T&E community (e.g., ATTC, ATEC, COMOPTEVFOR), Navy PMA 242, NAVAIR Competencies (4.0, 5.0,

Technical Review Criteria

Certification Effort	Acronym	Process Standard	P-8A IPT	Projected Completion Date	Actual Compliance Date
System Security Engineering – Information Assurance	(SSE - IA)	DODD 8500.1	SEIT	January 13, 2010	-

Certification Requirements



Technical Performance Measures and Metrics

Name (Reference)	Cognizant PMO Org.	Certification	Document (hot link if available)	Contractual Req'ts (DID/CLIN)	Description/Comments
SE Tradeoff Analysis for Affordability	SEIT	N/A	CAIV Plan	In RFP CDRL	SEIT, in conjunction with Program IPT, oversees execution of CAIV Plan required by JAGM SOW to address traceable interdependent relationships between system performance, system reliability, Average Unit Production Cost (AUPC) and Life Cycle Cost (LCC). KPPs are not CAIV candidates. CAIV Plan directs specific CAIV trade
ESOH	Life Cycle Safety IPT	N/A			
HSI	MANPRINT WG	N/A			
Manufacturing	Manufacturing IPT	N/A			
Reliability & Maintainability	Supportability IPT	N/A			

Design Considerations

Application	Description
BORIS	Boeing Opportunity, Risk and Issue System database tool is a cooperative effort of Boeing Commercial Airplanes and Boeing Integrated Defense Systems.
ClearCase	Produced by Rational Software, Inc. ClearCase is a software configuration management system that keeps track of which versions of which files were
ClearQuest	
DOORS®	
MET	
Sherlock	
TecView	
Trade Studies Log	
VDATS	

Engineering Tools

Technical Risks		Mitigation Activities (Closure Dates)
R1. Failure to meet TOC reduction goals may cause budget exceedance		Continue current plan; expedite cuff/yoke redesign (Dec 2015)
R2. Main rotor cuff/yoke redesign not complete in time for test		Certification milestone plan developed and monitored by PM. (Jun 2011)
Technical Issues		
1. Production parts; spares		Continue focus on contractor's SCM and make parts (ongoing)
2. Structural Repair Manual late to need		Expedite approval of DL&T's (ongoing with NAVAIR)
Opportunities		
O1. Capture lessons learned; best practices; store in command library		Low investment; great benefit for program and NAVAIR

Risks, Issues, and Opportunities

Responsibilities of DASD(SE) On Site Representative

- **Provide a two way conduit - promote the dissemination & compliance with OSD SE policy & obtain feedback to improve policy, guidance, and best practices**
- **Educate, inform, monitor, & assess the implementation of SE policy and best practices to programs, PEOs, and competencies**
- **Interface across the PEOs & Competencies to manage expectations and standardize products**
- **Provide engaged SE support to NAVAIR programs on OSD SE oversight as required**
- **Position adaptable to needs of OSD SE and NAVAIR**

Engagement Areas

SE WIPTs establishment & participation	Review planning & participation; SRR, PDR, CDR, PRR, IDR, & PSR
SEP development and approval	PDR and CDR Assessments
Metrics Collection, Analysis & Reporting	Pre-MDD planning
Reliability Growth Planning, Analysis & Reporting	Acquisition document development, review, and submission
Schedule Risk Assessment and planning	MS Prep & OSD Oversight reporting assistance /participation; IIPT, OIPT, DAB, and DAES
Program Technical Planning	RFP development and review

Based on program engagement, make recommendations to improve and update:
SE Policy, DoDI 5000.02, Defense Acquisition Guide, Defense Acquisition Program Support Methodology

Leadership Engagements Completed

- **VADM Architzel**
- **RADM Steve Eastburg**
- **RADM Bill Shannon**
- **RDML Randy Mahr**
- **Jessie McCurdy**
- **Lisa Nyalko**
- **Keith Sanders**
- **Glenn Perryman**
- **Mike Erk**
- **Stu Young**
- **Dave Wooten**

- **Leadership Feedback**
  - Supportive & enthusiastic about position & opportunities
  - Any reduction in “OSD churn” is a win
  - See most value in Competency & PEO level engagement
  - Two way learning – leverage: SESG, SEDIC, NSERC
  - Regular meetings with APEO(SE)s would be valuable
  - May be value in an SE drum beat between services & ODASD(SE)
  - Need to engage Mary Lacy, DASN (RDT&E)
  - Need to remain mindful of chain of command